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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,220	07/01/2003	Thomas Bradley Beddard	839-1470	1219
30024	7590	02/17/2006	EXAMINER	
NIXON & VANDERHYE P.C. 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203			KERNS, KEVIN P	
			ART UNIT	PAPER NUMBER
			1725	

DATE MAILED: 02/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/604,220

Applicant(s)

BEDDARD ET AL.

Examiner

Kevin P. Kerns

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,6,7 and 9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,6,7 and 9 is/are rejected.
- 7) ☒ Claim(s) 7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claim 7 is objected to because of the following informalities: in the 2nd line from the end of claim 7, replace "form" with "from" after "extending". Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 2, 6, 7, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Obrochta et al. (US 4,283,835) in view of the applicants' admitted

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prior art (paragraph [0002] of applicants' specification), and further in view of either Willett et al. (EP 1 022 434 A2) or Lee (US 6,234,753).

Obrochta et al. disclose a cambered core positioning system for use in casting of gas turbine airfoils, in which the cambered ceramic core 20 includes a solid curved upper body portion; a pair of substantially planar legs extending downwardly from the upper body portion, with the upper body portion being curved to form opposite concave 26' and convex 26 surfaces, and the pair of legs being separated by an elongated slot 37; and a plurality (arranged in pairs) of laterally aligned pegs (fixed pins 28,30,32 cooperating with respective spring-loaded movable peripheral pins 28',30',32', as well as cooperating movable centerline pins 34,34',36,36') projecting axially from opposite sides of the convex surface 26 of the upper body portion above and closer to the elongated slot 37, but spaced from an upper edge of the upper body portion (abstract; column 2, lines 55-68; column 3, lines 1-26; column 4, line 9 through column 7, line 54; and Figures 1-3). Obrochta et al. do not disclose that the pair of legs is co-planar, the pegs of elliptical cross section, and a core having an elongated open slot extending from a lower end of the core upwardly more than half a height dimension of the core.

However, the applicants' admitted prior art discloses a stage 1 gas turbine bucket that includes a (co-planar) "pants-leg" shaped core operable to form a pair of cooling passages to improve the cooling scheme of the turbine bucket (see paragraph [0002] of applicants' specification).

It would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to modify the design of the pair of legs of the cambered core used for casting gas turbine airfoils, as disclosed by Obrochta et al., by using a co-planar "pants-leg" shaped core, as taught by the applicants' admitted prior art, in order to form a pair of cooling passages to improve the cooling scheme of the turbine bucket (paragraph [0002] of applicants' specification).

Neither Obrochta et al. nor the applicants' admitted prior art specifically discloses pegs of elliptical cross section, as well as a core having an elongated open slot extending from a lower end of the core upwardly more than half a height dimension of the core.

However, Willett et al. disclose a gas turbine blade cooling configuration for gas turbine buckets, in which the cooling configuration is provided by one or more elliptically-shaped radial cooling passages 54 formed by utilizing elliptically-shaped quartz rods (pegs) within the ceramic core, such that the use of elliptically-shaped quartz rods (pegs) provides the advantages of creating coolant cross flow between adjacent radial passages while minimizing stress concentration in the bucket (abstract; paragraphs [0005]-[0010]; and Figures 1-3). Furthermore, Figure 1 shows a gas turbine blade cooling configuration having an array of cooling circuit dividing channels that must be manufactured by one or more cores having an elongated open slot extending from a

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lower end of the core upwardly more than half a height dimension of the core, such that such a core creates longer divided cooling channels that would result in improved cooling of the turbine blade, as one of ordinary skill in the art would have recognized.

In addition, Lee discloses a turbine airfoil with internal cooling, in which the internal cooling is provided by a plurality of core tie holes (42,142) that are preferably elliptical in cross-section, such that the core tie holes (42,142) would necessarily be created by using core supports in the form of elliptical pegs/rods, with the elliptical core tie holes providing the advantages of controlling coolant cross flow between adjacent radial passages (via minimizing pressure differential) while minimizing stress in the turbine airfoil (abstract; column 2, lines 10-17 and 40-67; column 3, line 1 through column 5, line 53; and Figures 1 and 2). Furthermore, Figures 1 and 2 show a turbine airfoil having an array of cooling circuit dividing channels that must be manufactured by one or more cores having an elongated open slot extending from a lower end of the core upwardly more than half a height dimension of the core, such that such a core creates longer divided cooling channels that would result in improved cooling of the turbine airfoil, as one of ordinary skill in the art would have recognized.

It would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to modify the cambered ceramic core disclosed by Obrochta et al., by using a co-planar "pants-leg" shaped core, as taught by the applicants' admitted prior art, in order to form a pair of cooling passages to improve the cooling scheme of the turbine bucket, and by further using pegs/pins with elliptical

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shapes, and a core having an elongated open slot extending from a lower end of the core upwardly more than half a height dimension of the core, as taught/suggested individually by Willett et al. and Lee, in order to create coolant cross flow between adjacent radial passages while minimizing stress concentration in the bucket (Willett et al.; paragraphs [0005] and [0010]), and in order to control coolant cross flow between adjacent radial passages (via minimizing pressure differential) while minimizing stress in the turbine airfoil (Lee; column 3, lines 29-31 and 62-67; column 4, lines 1-5 and 25-67; and column 5, lines 1-53). Furthermore, both Willett et al. and Lee disclose and/or suggest that the array of cooling circuit dividing channels made by one or more cores, as one of ordinary skill in the art would have recognized, are advantageous for creating longer divided cooling channels that would result in improved cooling of the turbine blade and airfoil, respectively.

Response to Arguments

5. The examiner acknowledges the applicants' amendment provided with the request for continued examination received by the USPTO on January 11, 2006. The applicants' amendments raise a new claim objection to claim 7. The applicants have cancelled claims 5 and 8, while incorporating the limitations of these cancelled claims into independent claims 1 and 7, respectively. Claims 1, 2, 6, 7, and 9 are currently under consideration in the application.

6. Applicants' arguments filed January 11, 2006 have been fully considered but they are not persuasive.

With regard to the applicants' remarks/arguments on pages 5 and 6 of the amendment, it is noted that the applicants have incorporated the limitations of cancelled dependent claims 5 and 8 into independent claims 1 and 7, respectively. The examiner respectfully disagrees with the applicants' two major arguments regarding these previously rejected claim limitations of cancelled claims 5 and 8, and newly underlined portions of the Obrochta et al. reference have been provided in above section 4. Furthermore, in any direction (radial, axial etc.), there are pegs in Obrochta et al. that are closer to the slot than to the upper edge, thus the phrase "in a radial direction" does not further limit claim 1 with respect to Obrochta et al. In addition, there are pegs extending from the convex surface of the solid, curved upper body portion of Obrochta et al., as the body of the pegs extend through both sides (convex and concave portions) of the core. As a result, the last three lines of claim 7 do not further limit this claim with respect to Obrochta et al.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kevin P. Kerns whose telephone number is (571) 272-1178. The examiner can normally be reached on Monday-Friday from 8:00am-5:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin P. Kerns *Kevin/Kerns 2/15/06*
Primary Examiner
Art Unit 1725

KPK
kpk
February 15, 2006